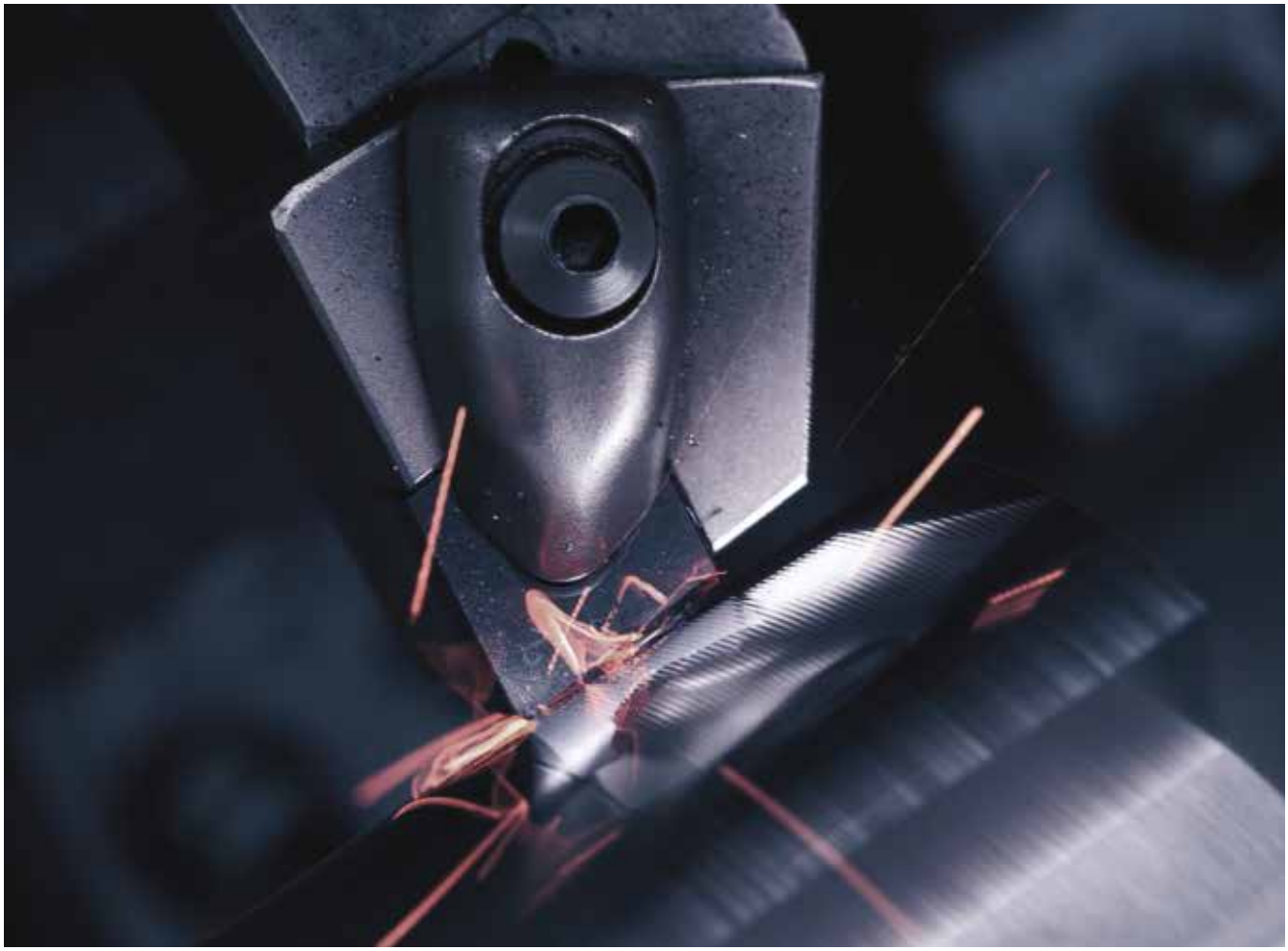
Features & Advantages

cBN Series

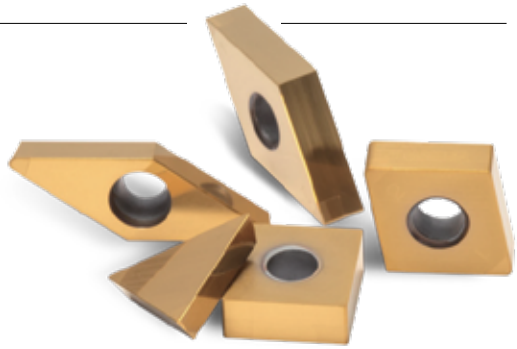


KORLOY

cBN Series

Turning of hardened steel and very hard materials requires advanced cutting tools. We introduce our inserts which withstand the generated high temperatures and cutting forces.

cBN Series

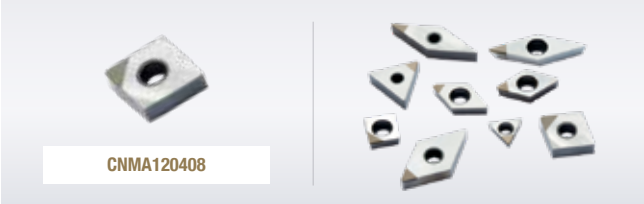


Advantages

Adding a special ceramic binder and a sintering process
leads to the excellent heat and wear resistance of our cBN turning inserts.

cBN-Inserts

Regrindable



- Reducing the tool cost by regrinding (3 - 4 times)

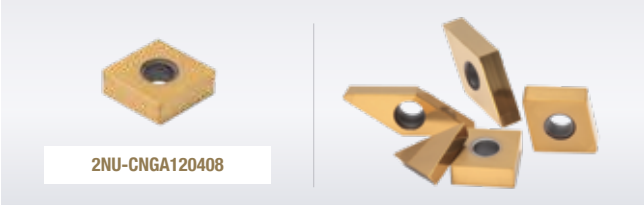
One-use

- Smaller and more economic cBN tip

Multi-edged

- Cost reduction - more cutting edges per insert

Multi-edged coated



- Full-cBN for maximized productivity

Solid cBN tip

- Increased stability thanks to the solid cBN tip

Solid cBN

- Full-cBN for maximized productivity

Code system (ISO)

4	NU	CNMA	12	04	08	WF	-	GA
❶	❷	❸	❹	❺	❻	❼		❽
No. of cBN tips	Type of cBN tip	Type	Cutting edge length Ø	Cutting edge height	Corner radius (Eck-R)	Cutting edge treatment detail		Chipbreaker

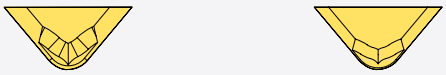
❷ Type of cBN tip

4 **NU** CNMA 12 04 08 WF - GA

NU	0.6 - 0.8 mm
NS	solid cBN tip
NT	1.6 mm

❽ Chipbreaker

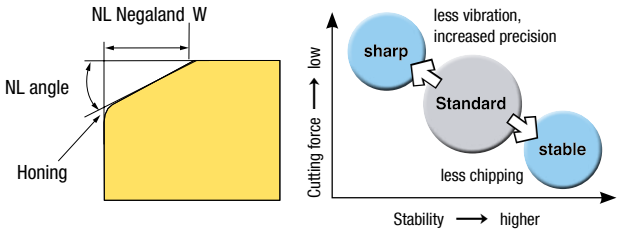
4 **NU** CNMA 12 04 08 WF - **GA**



RA | **GA**

❼ Cutting edge detail

4 NU CNMA 12 04 08 **WF** - GA

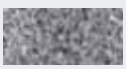


CNGA120408 **F**	CNGA120408 **None**	CNGA120408 **T**

Type	Symbol	Hardened steel			Cast iron		
		Honing	W (mm)	NL Angle	Honing	W (mm)	NL Angle
Sharp	F	Yes	0.15	15°	No	-	-
Standard	None	Yes	0.15	25°	No	0.15	15°
Stable	T	Yes	0.15	35°	No	0.15	25°
Wiper	W						

Features

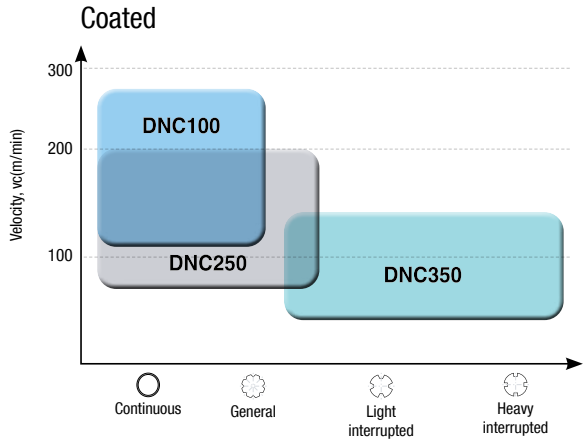
Explanation structure	Structure	cBN content	Grade	Application	Features
Tight arrangement of cBN particles		High ↓ Low	DB7000	Cast iron HRSA Sintered steel	• High cBN content and tight arrangement of the particles • Optimized for machining of cast iron, HRSA and sintered steel
"Loose" arrangement of the cBN particles			DNC100 DNC250 DNC350 DBN300 DB1000 DB2000	Hardened steel Cast iron Mold steel Tool steel Bearing steel	• Special binder for improved adhesion of the cBN-particles • Excellent wear resistance and toughness for machining of hardened steel and cast iron

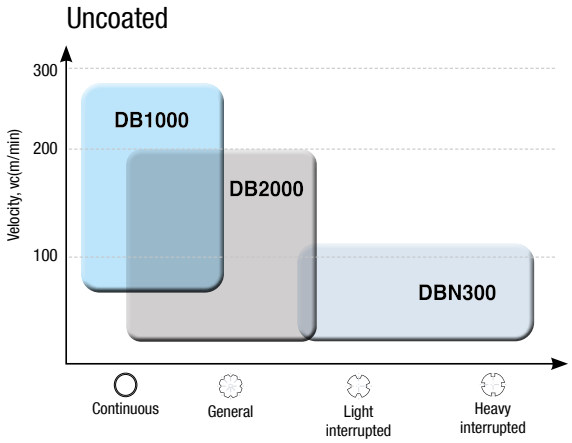
Application	Grade	Structure	Binder	cBN content (%)	Grain size (µm)	Hardness HV (Gpa)	Tensile strength (Gpa)
H Hardened steel (coated cBN)	DNC100		TiN	50 - 55	2	31 - 34	1.05 - 1.15
	DNC250		TiC	65 - 70	4	32 - 34	1.00 - 1.10
	DNC350		TiN	60 - 65	1	33 - 35	1.20 - 1.30
H Hardened steel	DB1000		TiCN	40 - 45	1	27 - 31	0.90 - 1.00
	DB2000		TiN	50 - 55	2	31 - 34	1.05 - 1.15
	DBN300		TiN	60 - 65	1	33 - 35	1.20 - 1.30
K Cast iron	DB7000		CO	90 - 95	2	41 - 44	1.20 - 1.30

cBN grades for hardened steel

KORLOY is steadily expanding the assortment of cBN inserts for machining hardened steel. The uncoated and coated grades provide the best solution based on workpiece and application requirements.

Grade information

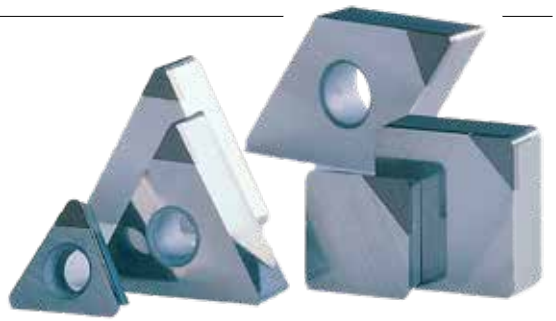




cBN Cutting conditions

Grade		Color	Application	Cutting conditions		
Coated	Name			Vc (m/min) 0 50 100 150 200 300	Feed rate (mm/rev)	ap
Coated	DNC100	Darkbrown	High speed, continuous cutting	180 – 300	0.03-0.30	0.03-0.30
Coated	DNC250	Gold	High speed, general machining	120 – 220	0.05-0.30	0.05-0.30
Coated	DNC350	Darkbrown	Light to heavy interrupted cutting	90 – 150	0.05-0.30	0.05-0.25
Uncoated	DB1000		High speed, continuous cutting	130 – 250	0.03-0.15	0.03-0.20
Uncoated	DB2000		Light to heavy interrupted cutting	80 – 200	0.03-0.20	0.03-0.30
Uncoated	DBN300		Heavy interrupted cutting	80 – 110	0.03-0.20	0.03-0.30

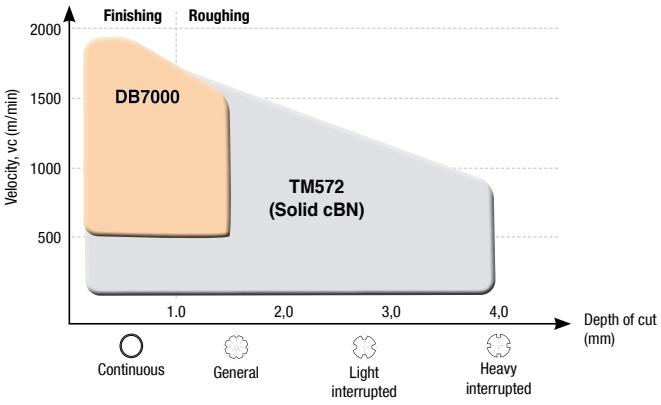
cBN grades for Cast iron



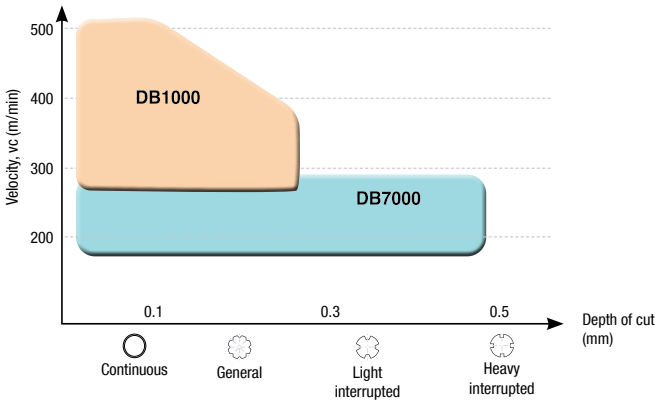
KORLOY offers versatile solutions to match your requirements in terms of productivity and process reliability.

Grade information

Grey cast iron



Ductile cast iron



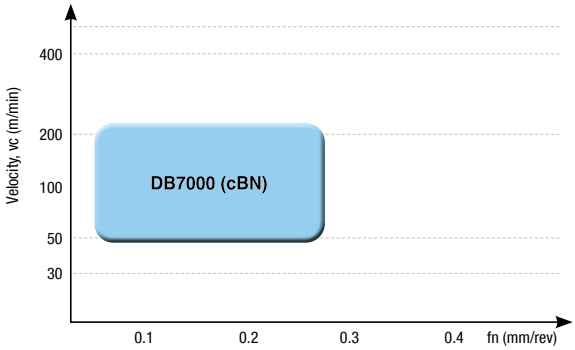
cBN Cutting conditions

Grade			Color	Application	Cutting conditions		
Material	Coated	Name			Vc (m/min) 100 500 1000 1500 2000	Feed rate (mm/rev)	ap
Grey cast iron	Uncoated cBN	DB7000		High speed, continuous cutting	500 — 2000	0.1-1.0	≤ 1.5
	Full cBN	TM572		General machining	300 — 2000	0.1-1.0	≤ 4.0
Ductile cast iron	Uncoated cBN	DB1000		High speed, continuous cutting	250 — 500	0.1-0.2	≤ 0.2
		DB7000		General machining	100 — 300	0.1-0.5	≤ 0.5

cBN for turning heat-resistant super-alloys

KORLOY offers a universal cBN grade for high performance machining of heat-resistant super-alloys.

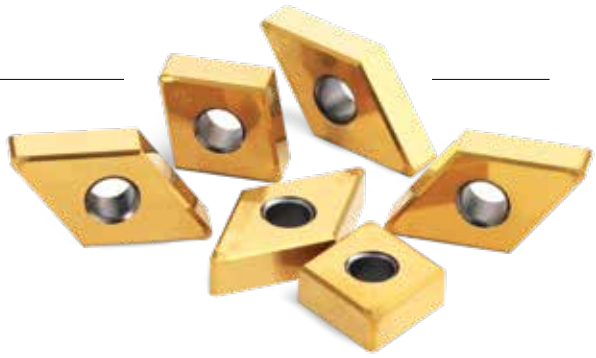
Grade information

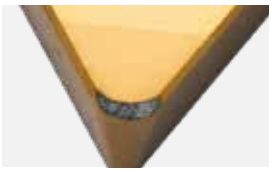
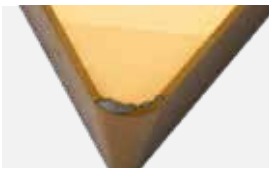


cBN Cutting conditions

Grade			Color	Application	Cutting conditions		
Material	Type	Name			Vc (m/min) 10 50 100 150 200	Feed rate (mm/rev)	ap
cBN	uncoated cBN	DB7000		High-speed machining, Finishing	50 — 200	0.05-0.25	≤ 1.0

Trouble shooting



Type	Solution
Flank wear 	Decrease velocity. Increase feed rate.
Crater wear 	Reduce cutting conditions. Choose harder grade.
Chipping 	Check machine stability, avoid vibrations. Dry machining. Use more stable cutting edge: - Bigger chamfer (angle & width) - Bigger nose radius
Cracks or breakage 	Check machine stability, avoid vibrations. Check/replace shim. Check position of tool (centralized) Dry machining, reduce cutting conditions. Use more stable cutting edge: - Bigger chamfer (angle & width) - Bigger nose radius, use wiper insert
Notch wear 	Increase velocity. Reduce feed rate. Adjust depth of cut.

Crater wear

When machining case-hardened steels, crater wear is common. The cause is chemical wear due to the extremely high temperatures and forces at the contact point between the workpiece and the insert. The crater wear weakens the cutting edge.

Flank wear

Flank wear occurs primarily during the machining of more abrasive steels such as bearing or tool steel.
The primary wear pattern is material removal (abrasion).
Severe flank wear has a negative effect on surface quality and dimensional accuracy.

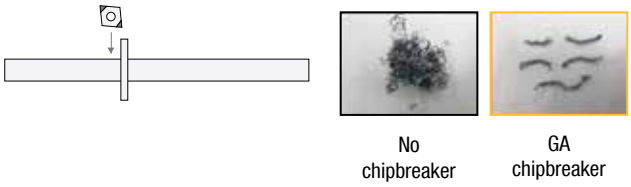
cBN chipbreaker (RA, GA)

Features

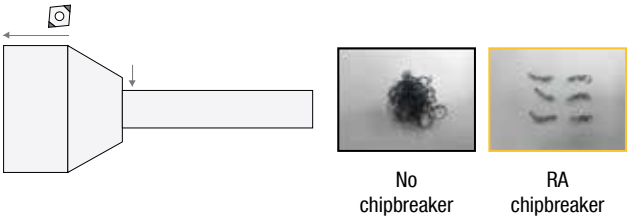
- Avoid long chips and damage to workpiece
- Ideal for unmanned production
- Chipbreaker 'RA' for roughing
- Chipbreaker 'GA' for finishing

Application examples

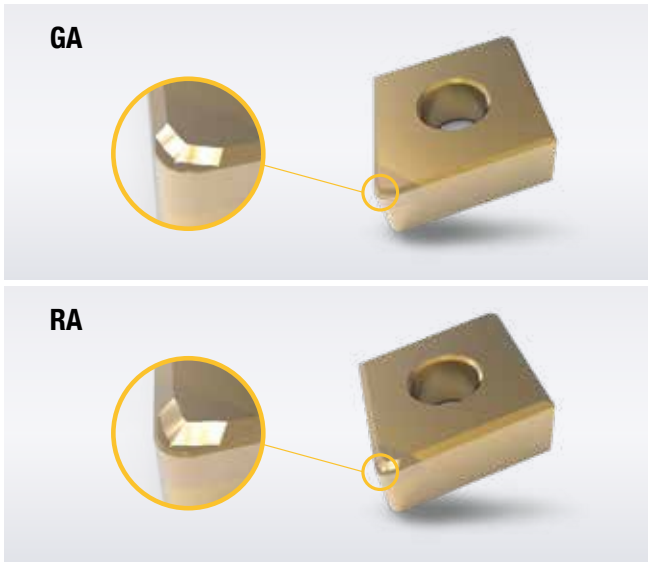
Designation:	2NU-CNGM120412-GA
Workpiece:	Drive shaft (Facing)
Cutting conditions:	Vc = 160 m/min, f = 0.1 mm/rev ap = 0.15 mm, wet



Designation:	2NU-CNGM120420-RA
Workpiece:	Shank (Facing & longitudinal)
Cutting conditions:	Vc = 210 m/min, f = 0.1 mm/rev ap = 0.3 mm, dry

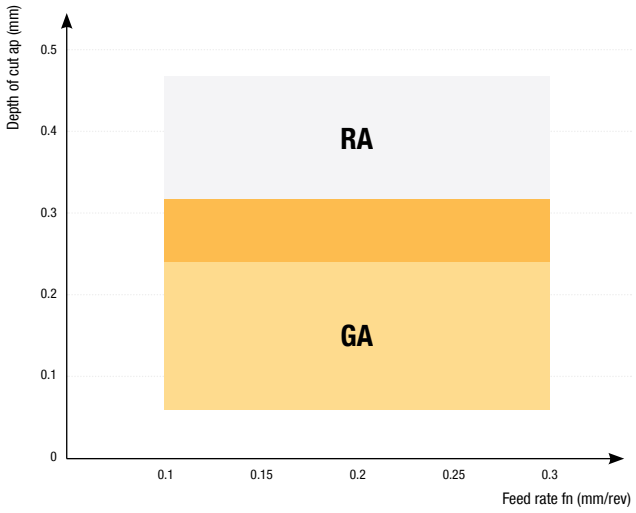


Chipbreaker



Optimized design for excellent chip control.

Application area



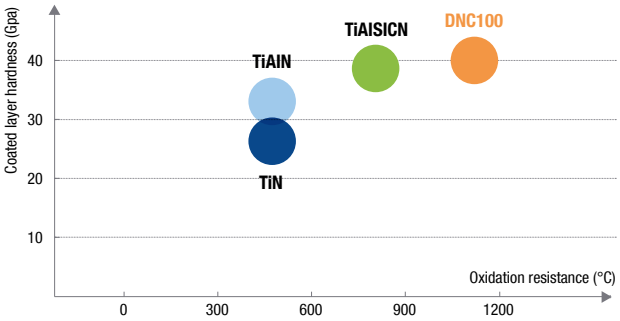
Coated cBN

DNC100

- O Continuous
- M Max. ap: 0.3 mm
- Coated
- H Hardened steel

Features

- Increased oxidation resistance and wear resistance.
- Dramatically improved fracture and shatter resistance.
- Wear resistant at high speeds.
- Very good thermal resistance with high oxidation temperature.
- Thin coating with high hardness and chipping resistance.

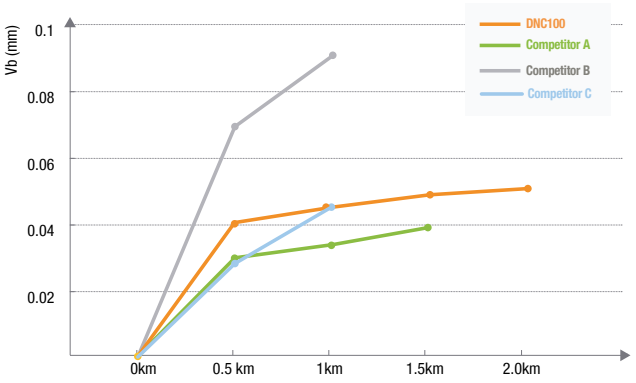


Features

Coated H Hardened steel

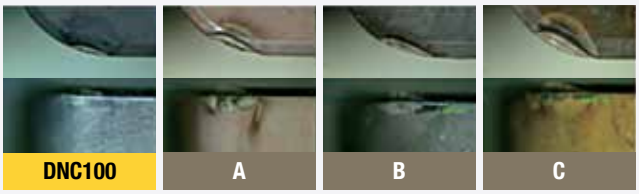
Grade	Structure	Binder	cBN content (%)	Grain size (μm)	Hardness HV (Gpa)	Shear strength (Gpa)
DNC100		TiN	50-55	2	31-34	1.05-1.15

Wear



Performance

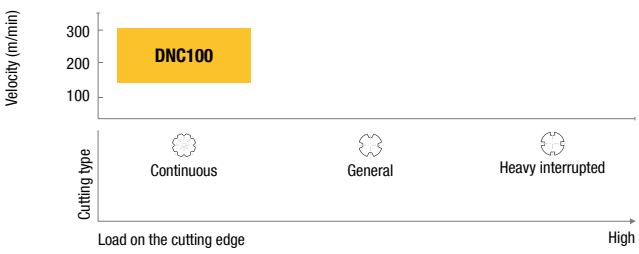
Wear resistance in high speed machining



Cutting conditions

- Designation: 2NU-CNGA120408
- Holder: DCLNL2525-M12
- Workpiece: SCM415 (58-62HrC)
- Velocity: 300 m/min
- Feed rate: 0.1 mm/rev
- Depth of cut: 0.1mm
- dry

Application area



Recommended cutting conditions

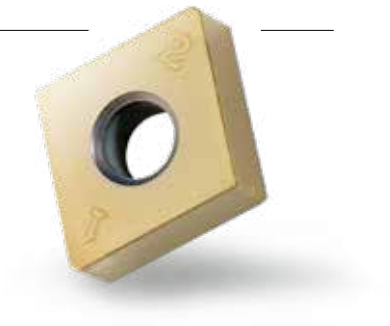
DNC100		
Velocity Vc (m/min)	Feed rate (mm/rev)	Depth of cut ap (mm)
180 — 300	0.03 — 0.3	0.03 — 0.3

- Wear and oxidation resistance are improved by the use of high hardness coatings.
- Significantly improved resistance to chipping, fracture and wear.

Coated cBN

DNC250

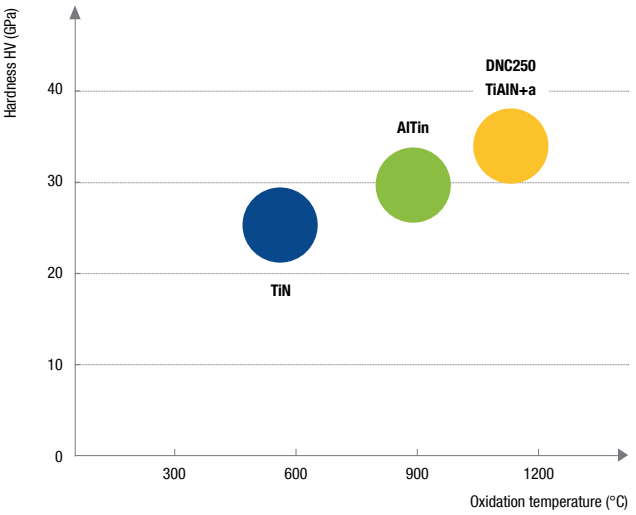
- O Continuous
- Light interrupted
- M Max. ap: 0.3 mm
- Coated
- H Hardened steel

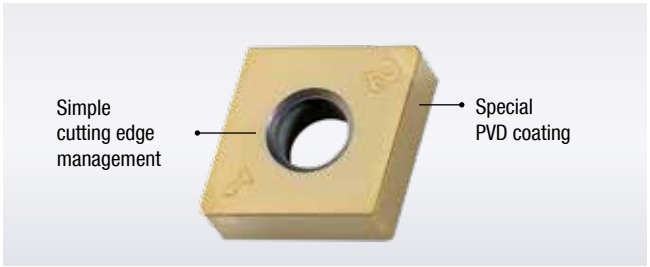


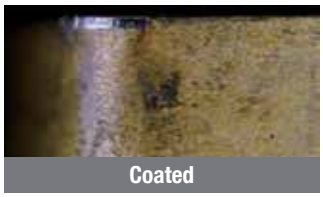
Features

- Longer tool life compared to conventional cBN
- Lower tooling costs due to multiple cutting edges per insert
- New PVD coating
- Thin film with high hardness and low frictional resistance
- Improved wear resistance

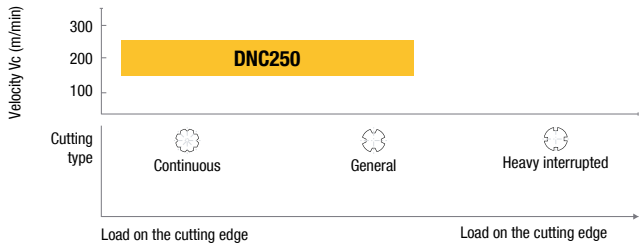
Features







Application area



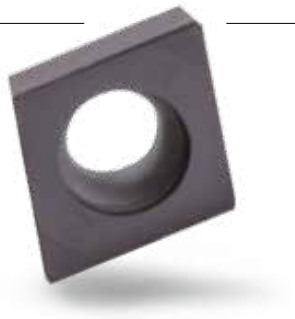
Recommended Cutting conditions

DNC250		
Velocity Vc (m/min)	Feed rate (mm/rev)	Depth of cut ap (mm)
120 — 220	0.05 — 0.3	0.05 — 0.3

Coated cBN

DNC350

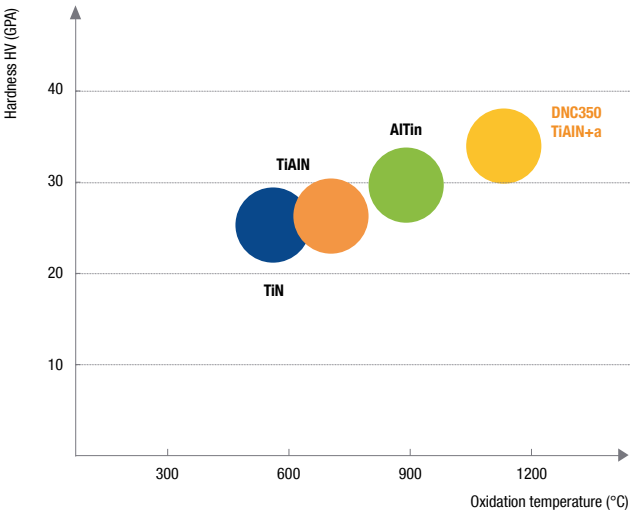
- Interrupted
- M Max. ap: 0.3 mm
- Coated
- H Hardened steel

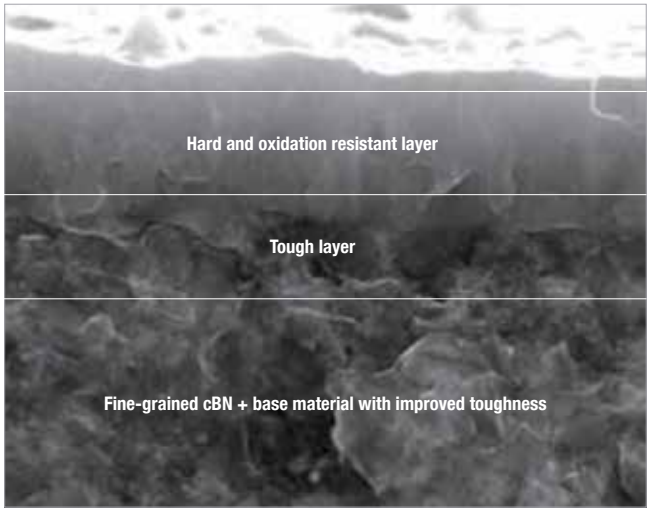


Features

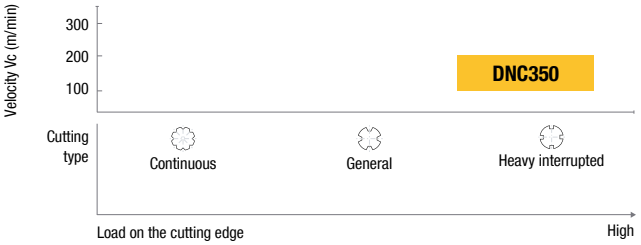
- Coated cBN for highly interrupted cut.
- Functionality and precision through durable cutting edge coating
- Economical product with long service life

Features





Application area



Recommended Cutting conditions

DNC350		
Velocity Vc (m/min)	Feed rate (mm/rev)	Depth of cut ap (mm)
120 — 150	0.05 — 0.3	0.05 — 0.25

Hard and oxidation resistant layer

→ improved wear resistance and oxidation resistance

Tough layer

→ Improved resistance to cut interruption and flaking

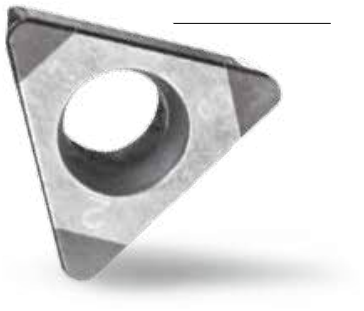
Fine-grained cBN + base material with improved toughness

→ improved wear resistance and oxidation resistance

Uncoated cBN

DB1000

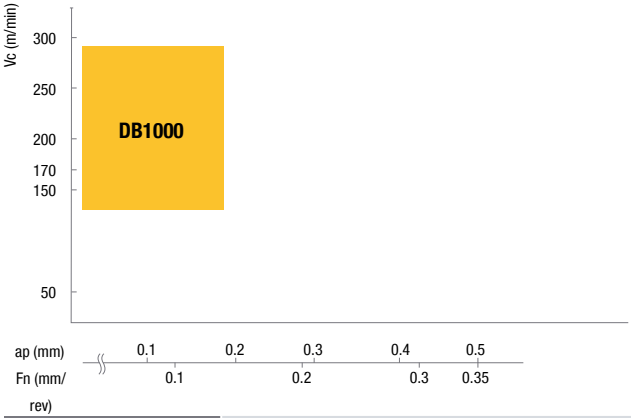
- O Continuous
- M Max. ap: 0.2 mm
- H Hardened steel

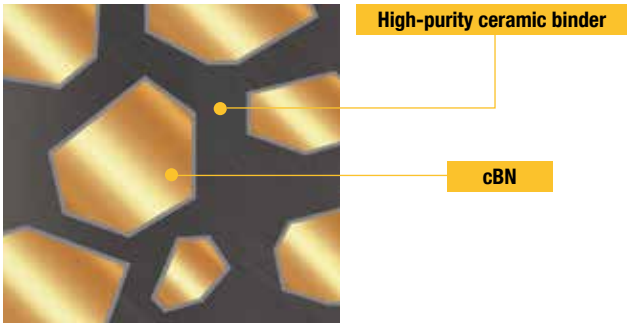


Features

- Grade for high speed machining
- With the best wear resistance of uncoated cBNs
- Long tool life in continuous and slightly interrupted cutting

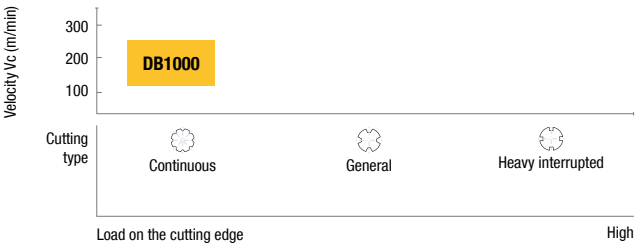
Application range





Grade	cBN				
	cBN content (%)	Grain size (μm)	Binder	Hardness HV (Gpa)	Shear strength (Gpa)
DB1000	40-45	1	high-purity TiCN	27-31	0.90-1.00

Application range



Recommended Cutting conditions

DB1000		
Velocity Vc (m/min)	Feed rate (mm/rev)	Depth of cut ap (mm)
130 — 250	0.03 — 0.15	0.03 — 0.2

Uncoated cBN

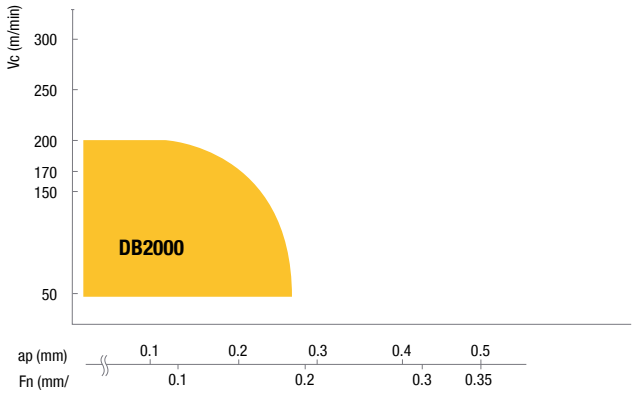
DB2000

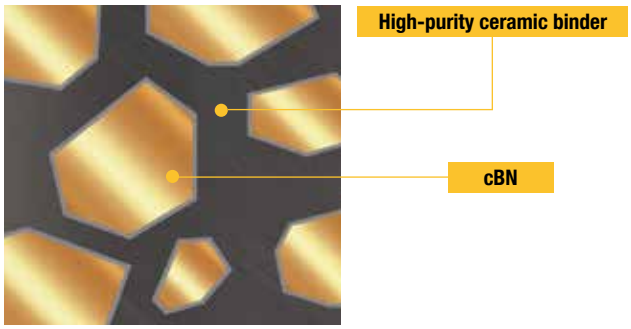
- O Continuous
- Light interrupted
- M Max. ap: 0.3 mm
- H Hardened steel

Features

- Grade with a wide range of applications for hardened steel
- Stable tool life in a wide machining range from continuous to slightly interrupted cut
- Both high resistance to chipping as well as wear resistance
- Improved surface finish

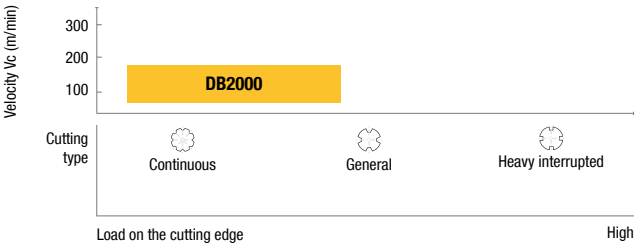
Application range





Grade	cBN				
	cBN content (%)	Grain size (µm)	Binder	Hardness HV (Gpa)	Shear strength (Gpa)
DB2000	50-55	2	high-purity TiCN	31-34	1.05-1.15

Application range



Recommended Cutting conditions

DB2000		
Velocity Vc (m/min)	Feed rate (mm/rev)	Depth of cut ap (mm)
80 — 200	0.03 — 0.2	0.03 — 0.3

Uncoated cBN

DB7000

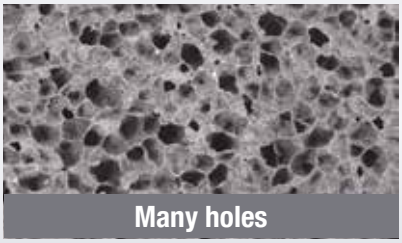
- O Continuous
- M Max. ap: 0.3 mm
- P Sintermetall
- K Cast iron
- S HRSA

Features

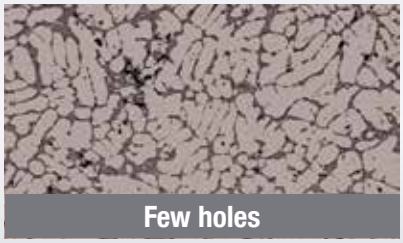
- Improved adhesion between the cBN particles reduces the formation of cracks
- Stable and long tool life and high efficiency in machining of cast iron and sintered metal
- High performance in heat resistant super alloys & sintered metals

Acid-treated cBN surface

cBN for Grey cast iron (Competitor)



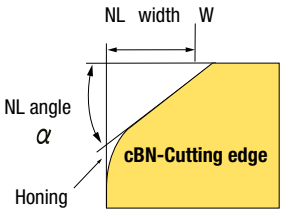
DB7000

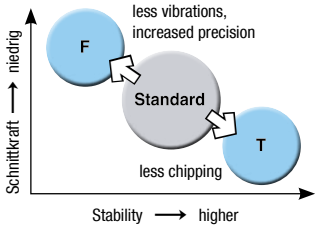


The treated surface provides improved wear resistance due to the increased density of CBN particles

Grade	cBN				
	cBN content (%)	Grain size (µm)	Binder	Hardness HV (Gpa)	Shear strength (Gpa)
DB7000	90-95	2	Co-Compound	41-44	1.20-1.30

Cutting edge treatment



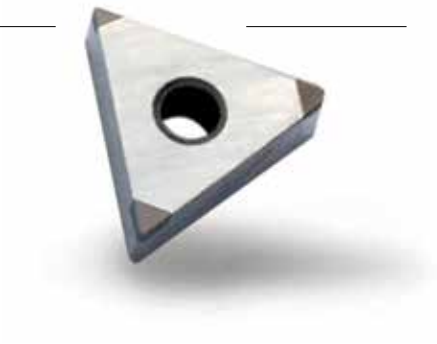


DB7000				
Type	Symbol	Honing	W (mm)	NL Angle
Sharp	F	-	-	-
Standard	None	N/A	0.12	15°
Stable	T	N/A	0.12	25°

Uncoated cBN

DBN300

- Interrupted machining
- M — Max. ap: 0.3 mm
- H — Hardened steel



Features

- Suitable for heavily interrupted machining
- Ideal tool life in difficult conditions

Grade	cBN				
	cBN content (%)	Grain size (µm)	Binder	Hardness HV (Gpa)	Shear strength (Gpa)
DBN300	60-65	1	TiN	33-35	1.20-1.30

Uncoated Solid cBN

TM572

- Interrupted machining
- O — Continuous
- K — Cast iron

Features

- Universal grade for machining grey cast iron
- Full-cBN

Grade	cBN	
	cBN content (%)	Application
TM572	90	Grey cast iron, continuous to interrupted cut

Available inserts

One-use type

Relief angle	Geometry
Positive	**CCGW0602**
Positive	**CCGW09T3**
Positive	**CCGW1204**
Negative	**CNGA1204**
Positive	**CPGW0802**
Positive	**CPGW0903**
Positive	**DCGW0702**
Positive	**DCGW11T3**
Negative	**DNGA1104**
Negative	**DNGA1504**
Negative	**DNGA1506**
Positive	**SCGW09T3**
Negative	**SNGA1204**
Positive	**SPGN0903**
Positive	**TCGW0902**
Positive	**TCGW1102**
Positive	**TCGW16T3**
Negative	**TNGA1103**
Negative	**TNGA1604**
Negative	**TNGA2204**
Positive	**TPGB1103**
Positive	**TPGN1603**
Positive	**TPGW0802**
Positive	**TPGW0902**
Positive	**TPGW1102**
Positive	**TPGW1103**
Positive	**TPGW1604**
Positive	**VBGW1102**
Positive	**VBGW1103**
Positive	**VBGW1604**
Positive	**VCGW1103**
Positive	**VCGW1604**
Negative	**VNGA1604**

Regrindable typ

Relief angle	Geometry
Negative	**CNGA1204**
Negative	**DNGA1504**
Negative	**DNGA1506**
Negative	**TNGA1604**
Negative	**VNGA1604**
Positive	**CCGW0602**
Positive	**CCGW09T3**
Positive	**DCGW0702**
Positive	**DCGW11T3**
Positive	**TPGN1103**
Positive	**TPGN1603**
Positive	**VBGW1604**
Positive	**VCGW1103**
Positive	**VCGW1604**

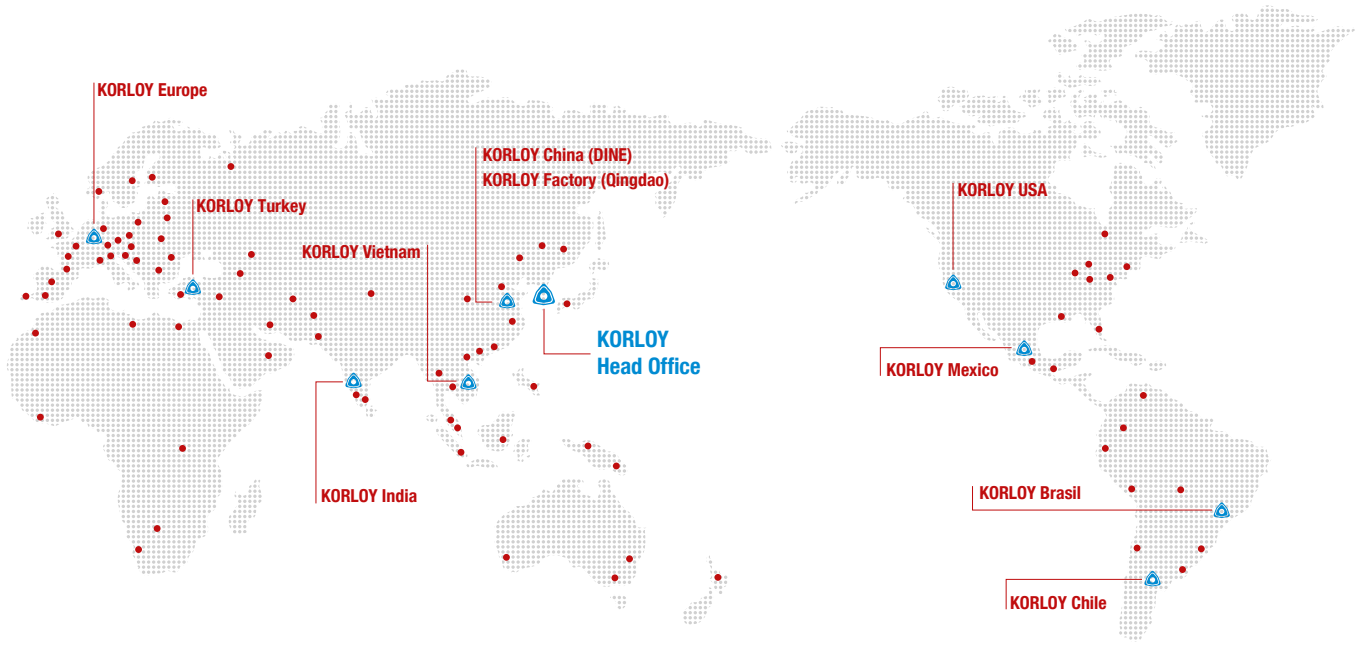
Full cBN

Relief angle	Geometry
Negative	**CNMN120408**
Negative	**CNMN120412**
Negative	**DNMN110308**
Negative	**DNMN110312**
Negative	**SNMN120408**
Negative	**SNMN120412**
Negative	**RNMN090300**
Negative	**RNMN120400**
Negative	**RNGN090300**
Negative	**RNGN120400**

Grade comparison

Application area		KORLOY	NTK	Kyocera	TaeguTec	Sumitomo	Tungaloy	Seco	Mitsubishi	Sandvik	Kennametal
H Hardened steel	H01	DNC100 DB1000	B521K	KBN510 KBN05M KBN10M		BN1000 BNC100	BXM10 BX310	CBN10 CBN100 CBN60K	MBC010 MB810	CB50 CB7050	PB250
	H10	DNC250 DB2000	B521K	KBN525 KBN25M KBN05M	KB90A TB650	BNC160 BNC200 BN2000	BXM10 BX330 BX530	CBN10 CBN100 CBN150 CBN60K CBN160C	MBC020 MB8025 BC8020	CB20 CB7015	KB1645 KD050 KD120 KB9610
	H20	DNC350 DB2000	B421K B422K	KBN30M KBN35M KBN900		BNC200 BNX20	BXM20 BX360	CBN150 CBN160C	BC8020 MB8025 MB825	CB7025 CB7035	KB5625 KB1615
	H30	DNC350 DBN300	B421K B422K			BNC300 BN350 BNX25	BXM20 BXC50 BX380		BC8020 MB835		KB9640
K Cast iron	K01	DB1000 TM572	B230K	KBN60M KBN65B	KB90	BNC500	BX930 BX870		MB710	CB50 CB7050	KD120 PB100
	K10	DB1000 DB7000 TM572	B205K B300K	KBN60M KBN900 KBN65B	KB90A	BN700 BN7000 BN7500	BX470 BX480 BX950	CBN200 CBN300 CBN300P CBN400C	MB710 MB730	CB7925 CB7525	KB1645 KB9610
	K20	DB7000 KB370 TM572	B205K B300K	KBN900	KB90A	BN700 BN7000 BNS800	BXC90 BX90S	CBN200 CBN300 CBN300P CBN400C	MB730 MBS140 BC5030		
	K30	DB7000 TM572	B205K B300K			BNS800	BX90S BXC90	CBN500	MBS140 BC5030		KB9640 KB1340
S HRSA	S01	DB7000		KBN65B		BN700 BN7000	BX950		MB730		

KORLOY



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